

Date: Tue, 7 Jun 94 04:30:37 PDT  
From: Ham-Homebrew Mailing List and Newsgroup <ham-homebrew@ucsd.edu>  
Errors-To: Ham-Homebrew-Errors@UCSD.Edu  
Reply-To: Ham-Homebrew@UCSD.Edu  
Precedence: Bulk  
Subject: Ham-Homebrew Digest V94 #153  
To: Ham-Homebrew

Ham-Homebrew Digest                      Tue, 7 Jun 94                      Volume 94 : Issue 153

Today's Topics:

40 meter cw qrp rig and 65 watt computer power supply for sale  
900mhz transciever  
Converting the Radio Shack 5ch 49MHz ht to 6m  
LowFER: VLF Activities & VLF Transcivers ???  
PCB via Laserjet  
What's the DAC for?

Send Replies or notes for publication to: <Ham-Homebrew@UCSD.Edu>  
Send subscription requests to: <Ham-Homebrew-REQUEST@UCSD.Edu>  
Problems you can't solve otherwise to brian@ucsd.edu.

Archives of past issues of the Ham-Homebrew Digest are available  
(by FTP only) from UCSD.Edu in directory "mailarchives/ham-homebrew".

We trust that readers are intelligent enough to realize that all text  
herein consists of personal comments and does not represent the official  
policies or positions of any party. Your mileage may vary. So there.

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Date: Mon, 6 Jun 1994 21:38:17 GMT  
From: rit!isc-newsserver!ultb!bad1679@cs.rochester.edu  
Subject: 40 meter cw qrp rig and 65 watt computer power supply for sale  
To: ham-homebrew@ucsd.edu

I am selling a homebrew 40 meter cw transciever. It covers 7.000-7.075  
and about 7.100 - 7.175 mhz, puts out about 2 watts. The receiver is a  
direct conversion type, but uses very good audio filtering.

The rig was based on the article in August 1980 issue of QST by W7EL and  
improved with better double tuned band pass filter and a chebychev filter in  
front of the audio preamp.

I am also selling a 65 Watt computer power supply (I believe it came out of an  
XT).

Any inquiries, please email to bad1679@ultb.isc.rit.edu

Thanks..

Bernie Doehner nu1s/2

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Electrical Engineering, Rochester Institute of Technology, Rochester, NY  
Ax25 Packet: NU1S @ WB2PSI.#WNY.NY.USA.NOAM (normal packet route)  
TCP/IP: nu1s@nu1s.ampr.org [44.69.0.37]  
Internet (school): bad1679@ultb.isc.rit.edu

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Date: 7 Jun 94 06:07:33 GMT  
From: dog.ee.lbl.gov!agate!usenet.ins.cwru.edu!cleveland.Freenet.Edu!  
au440@ucbvax.berkeley.edu  
Subject: 900mhz transciever  
To: ham-homebrew@ucsd.edu

How would I build a snythesized 900 mhz transciever? I  
want to build a separate unit for contesting. Are there any  
good recipies that someone could recommend or acquire for me?

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Kieran D. au440

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Date: 6 Jun 94 21:04:00 GMT  
From: dog.ee.lbl.gov!ihnp4.ucsd.edu!news.service.uci.edu!ttinews!avatar!  
sorgatz@ucbvax.berkeley.edu  
Subject: Converting the Radio Shack 5ch 49MHz ht to 6m  
To: ham-homebrew@ucsd.edu

Well, this isnt how I wanted to publish this, but it seems that  
it's necessary. The 5 ch units are pll controlled and if you look  
at the schematics you will notice that the base freq for the pll  
is xtal controlled. If you look closer you willll also notice the  
Aussies have a version of this thing running in the 55MHz area  
and the only difference is the pll xtal!

Therefore, find a xtal at or near 10.24 MHz - this will give you  
operation from 50.610 MHz in 15KHz steps. You might also want to  
reduce the size of the final transistor's bias resistor, 8-10Kohms  
seems to increase the power out greatly..like 450mW or so, but the  
battery life is dramatically foreshortened! Peak and tweek as needed.

It's not good for repeaters, it's not powerful, but it IS CHEAP!  
..and it is 6m FM which is really fun at hamfests, swap meets and

the like where everyone else is competing for the usual 146.52 and 223.5 and such like.

Next time I'll tell you how to easily convert a cheap CB ht to run at 29.6MHz...with FM optional!

73! de KB6LUY/temp AA

-Avatar-> (aka: Erik K. Sorgatz) KB6LUY +-----+  
TTI(es@soldev.tti.com)or: sorgatz@avatar.tti.com \*Government produces NOTHING!\*  
3100 Ocean Park Blvd. Santa Monica, CA 90405 +-----+  
(OPINIONS EXPRESSED DO NOT REFLECT THE VIEWS OF CITICORP OR ITS MANAGEMENT!)

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Date: 6 Jun 1994 16:22:02 GMT  
From: ihnp4.ucsd.edu!dog.ee.lbl.gov!agate!howland.reston.ans.net!math.ohio-  
state.edu!jussieu.fr!univ-lyon1.fr!swidir.switch.ch!scsing.switch.ch!elna.ethz.ch!  
chopin!rs@network.ucsd.edu  
Subject: LowFER: VLF Activities & VLF Transceivers ???  
To: ham-homebrew@ucsd.edu

I am interested to learn more about VLF activities. I heard that there are some HAMS involved in VLF work and that there are LowFER groups. Currently I am breeding on some VLF-transceiver ideas and would be glad for suggestions, references etc.

Any pointers ? Thanks for your help.

vy 73s,  
Rolf

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Date: 6 Jun 1994 18:10:58 -0700  
From: ihnp4.ucsd.edu!library.ucla.edu!psgrain!news.tek.com!gazette!not-for-mail@network.ucsd.edu  
Subject: PCB via Laserjet  
To: ham-homebrew@ucsd.edu

Hi Everyone,

Earlier, I had mentioned in a posting that I had a few twists on this topic.

If you can get your hands on a copy of Midnight Engineering ( Jan-Feb 94 I think) There is a pretty good article on doing just this.

There are some companies that are selling specialty media for this purpose. My experience with them is that they work OK, but are spendy (OK, so it's only \$2 per sheet, but I'm really cheap). What I have found that works the best is Ink jet paper.

To recap the basic process:

- 1) Print the circuit board image on a laser printer, reverse image using whatever computer and drawing package you have available. (I prefer using ORCAD with a Postscript driver, but have used a Mac 512 with MacDraw in the past)
- 2) Register both layers (if you are doing two sided boards) on a light table (or against a window looking outside at the daylight) Tape three sides of the papers to form a little envelope.
- 3) Slip a peice of copper circuit board into the envelope you made. You will have to make sure that it is big enough to cover all the traces, but small enough to fit into the envelope.
- 4) Iron one side of the circuit board thoroughly, using the edge of the iron as much as possible. When in doubt of whether the toner is sticking to the board, iron some more (more is better) you should spend about a minute or two per side. Turn the board over, iron the other side.
- 5) Peel off the paper and etch using ferric chloride (I haven't tried the other chemicals, but they should work fine)
- 6) Clean off the excess toner using steel wool, ajax, etc.
- 7) Drill and fill.

Special twists and notes:

Some folks like to drill before etching, that works OK, but I like to see the results first before I drill it. If you drill afterward, you might lift pads here and there. Practice helps. If you drill before, sometimes the edges of the hole will etch too.

Use Ink-Jet printer paper, the smoothest you can find. Because Ink-Jet Paper has an absorbant coating (usually clay coated to aid in drying time), the fibers of the paper usually do not get imbedded in the toner. Earlier, I had experimented with a variety of papers, and found these to work the best. Other papers tend to leave paper fibers in the toner which is fused into the copper, this tends to make pin-holes in the etched board.

Before you try peeling the paper, let it soak in water to loosen the paper. Because the clay coating is put onto many of these types of paper with water, water tends to loosen the paper from the clay coating. I usually let them soak for a half-hour or so, but have soaked as little as 5 minutes, or as long as overnight with no adverse effects. The board soaked overnight required little rubbing to loosen the paper, the board that only soaked for 5 minutes took a lot of rubbing with the fingers to get all of the paper off. A lot of it depends on the paper being used (I am using Tektronix ColorQuick paper, but since I work for Tektronix, it is cheap and plentiful...your milage may vary).

Use the sharpest drill bits you can find. Check with a local dentist to see if they have any dull dental burrs you can have, or buy some from the local hobby store.

I have been using a Tee-shirt press to laminate my images to the circuit board. Having a compliant rubber surface works a lot better than using a hand iron.

A friend of mine is using a small iron from a hobby shop used for applying heat shrink plastics to remote control airplanes. I plan to make a press out of an old waffle iron (two heated surfaces) and some silicone foam pads. Again, the rubber of the Tee-shirt press tends to do a much better job of laminating the toner to the board than using a home type iron.

After making the circuit board and cleaning thoroughly, I have taken another laser print of the parts placement silkscreening, and laminated it to the board using the same process, it looks really impressive. I have also laminated the solder resist layer onto a finished board, this also looks good, and has the added bonus of protecting the board from oxidation while still allowing it to be soldered.

You may have to touch up the board with a permanent ink marker, but in the 25 or so boards I've done so far, this has only been necessary on the first few. Oh yeah, so far, this method has worked for RF, digital, surface mount down to about 8 mil traces (use a good printer for these), and of course, through hole.

I'm working on through hole plating next, but that is a little more tricky. Midnight Engineering had a good article on doing that in some issue?

Thanks to all those who sent me E-Mail, sorry I didn't have time to reply directly, but work keeps me pretty busy. I hope this helps.

The usual disclaimers apply, your milage may vary, etc.

Ed Burress  
Tektronix, Inc. MS 63-356  
Wilsonville, Ore. 97070-1000

"a wise monkey never monkeys with another monkeys monkey"

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Date: 6 Jun 1994 23:09:18 GMT  
From: ihnp4.ucsd.edu!usc!elroy.jpl.nasa.gov!lll-winken.llnl.gov!korie!newsworthy.West.Sun.COM!abyss.West.Sun.COM!spot!myers@network.ucsd.edu  
Subject: What's the DAC for?  
To: ham-homebrew@ucsd.edu

In article 32939@husc14.harvard.edu, dlleigh@frank.harvard.edu (Darren Leigh) writes:

>I've been reading Ulrich Rohde's article in the June issue of QST. In  
>figure 14 he shows a block diagram for a DDS-driven PLL. The DDS feeds  
>a DAC, which gets filtered and then hard limited. This hard limited  
>signal (a square wave) is then used as an input to the PLL.  
>  
>My question is: what's the DAC for? Why not just drive the PLL with the  
>MSB of the DDS. It's seems like a waste to make a nice filtered analog  
>signal from the DDS output and then just make a square wave again.  
>  
>My guess is that it has something to do with decreasing phase noise, but  
>I don't see how it does that. Does anyone have any ideas?

Yeah. The noise output of a DDS synthesizer is determined, in part, by the DAC. In theory, the maximum attainable signal/noise ratio of the DDS is  $6\text{dB} \times \text{Number of DAC bits}$ . A 10 bit DAC promises 60dB S/N, a 1 bit DAC promises 6dB S/N.

There's a trick, though; the spurious noise output of a DDS is not always evenly distributed; sometimes it isn't distributed very much. This has the effect of producing an output which is mostly very clean with a limited number of severe spurs.

In the case of using the MSB only, there would be some specific frequencies

where the output was a very clean, symmetrical square wave. However, at most frequencies, you'd have an asymmetrical square wave which is different from cycle to cycle; serious phase noise.

Even when you limit a sine wave into a square wave, you don't change the noise due to phase variations (i.e. phase noise) (limiting does reduce/eliminate noise due to amplitude variations). Therefore, to get a low phase noise square wave from a DDS, you need to generate the lowest possible noise sine wave, then limit it.

Does this help?

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\* Dana H. Myers KK6JQ, DoD#: j | Views expressed here are  
\*  
\* (310) 348-6043 | mine and do not necessarily \*  
\* Dana.Myers@West.Sun.Com | reflect those of my employer  
\*  
\* This Extra supports the abolition of the 13 and 20 WPM tests \*

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Date: 6 Jun 1994 17:44:12 GMT  
From: ihnp4.ucsd.edu!swrinde!gatech!newsxfer.itd.umich.edu!zip.eecs.umich.edu!  
yeshua.marcam.com!news.kei.com!ub!csn!col.hp.com!news.dtc.hp.com!hpscit.sc.hp.com!  
rkarlqu@network.ucsd.edu  
To: ham-homebrew@ucsd.edu

References <2sf9oc\$jjk@cismsun.univ-lyon1.fr>, <CqoBJE.K96@hpbmqoea.sqf.hp.com>,  
<jdow.770879025@bix.com>shu  
Subject : Re: SSB Filters

In article <jdow.770879025@bix.com>, jdow on BIX <jdow@BIX.com> wrote:

>Um, 200ppm pretty much wants more than a simple varicap to make it happy. Even  
>with carefully selected (and spurious de-Q-ed inductors) past 200ppm it is  
>remarkably easy to get into odd spurious oscillations due to crystal spurs. As  
>you mention, I'd never try pulling an overtone crystal farther than its base  
>frequency tolerance at best. (I learned that one the hard way. Just barely  
>made that one work.)  
>  
>{^\_^} jdow@bix.com

Of course you need more than a simple varicap to get 200 ppm (see my previous post). I happened to need to build a 19.2 MHz. VCXO last week, and I had no trouble tuning 4000 ppm below series resonance and 2000 ppm above series

resonance (that's a total of over 100 kHz.). When I tried to go above 2000 ppm on the high side, I did have some (predictable) trouble jumping to a spurious xtal response up there.

Rick Karlquist N6RK  
rkarlqu@scd.hp.com

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End of Ham-Homebrew Digest V94 #153  
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